

REMARKS

Claims 12 and 13 stand objected to because of vagueness regarding location of the referenced substituents. The present amendment clarifies this by specifying the substituents of the host and the dopant. The band-gap of the dopant must be sufficient to emit green light and that of the host must be higher than that of the dopant to permit transfer of energy from the host to the dopant so the substituents must be selected to be matched in that regard.

Claims 18 and 19 stand objected to because the “and” between “halide” and “alkyl” is unnecessary and it is suggested the “and” be replaced with a comma. Applicants have amended these claims accordingly.

Claims 1-11, 13-23, 25, and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 5,972,247) in view of “New Laser Dyes”, Applied Physics (Berlin), volume 3, no. 1, pages 81-88, (1974).

Instant claim 1 requires an organic electroluminescent device comprising a light-emitting layer containing a host and a dopant where the dopant comprises a boron compound containing a biz(azinyl)methane boron complex group. Shi is relied on for a general teaching of using light emitting layers containing hosts and dopants. The taught hosts include tris(8-quinolinol)aluminum or 9,10-di-(2-naphthyl)anthracene. Shi is said to teach the desirable of highly fluorescent dyes as emitters but does not specifically teach the boron complex of the present claims. The Examiner then notes that the Applied Physics publication discloses a compound V-12 that is identical to Inv-10 of the present application. The Examiner then concludes that it would be obvious to combine the host of Shi with the Boron complex of the Applied Physics publication in an OLED device. The Applicant respectfully disagrees.

Shi teaches OLED devices and confirms that it is known to use fluorescent dyes as emitters in combination with a host. Although the patentee prefers highly fluorescent materials, this teaching relates to the emission as it exists in the solid state OLED device. Shi does not teach that all materials that fluoresce under any conditions will do so in the solid state arrangement of an OLED. He simply notes that this has been a useful combination and thus a possible combination to try. “Highly fluorescent” dyes are preferred meaning those compounds that release a large portion of their energy as visible light.

The Applied Physics article is directed to materials that are useful as laser dyes which are not related to and readily distinguished from solid state

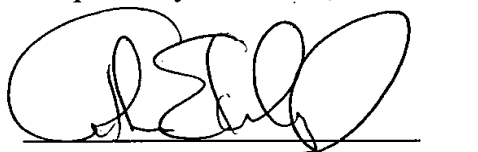
dopants for OLED devices. These laser dyes are employed in liquid form in a solvent to emit light for use in a laser. The amount of light emission is a function of the concentration of the emitter in the solvent and the particular emitter and solvent selected. There is no rationale that predicts the suitability for fluorescing in solid state from laser fluorescence in solution and obvious to try is not a valid basis for rejecting a claim.

Claims 1-11, 13-15, and 19-26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 5,972,247) in view of "Fluorescent Tricyclic beta-Azavinamidinium-BF₂ Complexes", Sathyamoorthi et al., Heteroatom Chemistry, Vol. 4, No. 6, pages 603-608, 1993. The Examiner relies on the Sathyamoorthi reference for its teaching of fluorescent dye "compound 3" with a maximum peak wavelength of 468nm. This document is not related to OLED solid state emissions and, in fact, the reference deals with the color of the dye and therefore its absorption maximum rather than its emission maximum under solid state conditions. Absorption pertains to the preferential absorption of certain light under normal conditions while emission pertains to the light emitted upon the release of energy resulting from relaxation of electrons after an excitation event. These are totally different molecular occurrences and cannot be likened for obviousness. Also, 468nm does not appear to be green light according to the attached spectrum from Sturge et al., Imaging Processes and Materials, page 11, enclosed.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 5,972,247) in view of "Fluorescent Tricyclic beta-Azavinamidine-BF₂ Complexes", Sathyamoorthi et al., Heteroatom Chemistry, Vol. 4, No. 6, pages 603-608, 1993 in further view of Shirasaki (US 5,834,894). Shi '721 and the Heteroatom Chemistry article are relied upon as set forth above for the rejection of claim 12. It is believed that this rejection is overcome due to the inapplicability of the references for the same reasons as stated for claim 1 above.

The Examiner is respectfully requested to reconsider the outstanding rejections and to pass this application to allowance.

Respectfully submitted,



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Enclosure:

Sturge et al., Imaging Processes and Materials, Van Nostrand (1989) p11.